

1 We claim:

1 1. A power supply module removably disposed in an automated data storage and  
2 retrieval system, said automated data storage and retrieval system comprising one or a plurality  
3 of first power connection devices, one or a plurality of second power connection devices, and  
4 one or a plurality of accessors for accessing and transporting said power supply module, wherein  
5 said one or more accessors each comprises at least one gripper mechanism, said power supply  
6 module comprising:

7 an enclosure having a first side and a second side;

8 a power supply internally disposed within said enclosure, wherein said power supply  
9 transforms first power having a first voltage into second power having a second voltage;

10 a first attachment device disposed on said enclosure, wherein said first attachment device  
11 can be releaseably attached to said gripper mechanism;

12 a first connector disposed on said enclosure and connected to said power supply, wherein  
13 said first connector can be releaseably connected to one of said one or a plurality of first power  
14 connection devices and releaseably connected to one of said one or a plurality of second power  
15 connection devices.

1 2. The power supply module of claim 1, further comprising a second connector  
2 disposed on said enclosure and connected to said power supply, wherein said first connector can  
3 be releaseably connected to one of said one or a plurality of first power connection devices, and  
4 wherein said second connector can be releaseably connected to one of said one or a plurality of  
5 second power connection devices.

1           3.     The power supply module of claim 1, further comprising a second attachment  
2 device disposed on said enclosure, wherein said second attachment device can be releaseably  
3 attached to said gripper mechanism.

1           4.     The power supply module of claim 3, wherein said first attachment device and  
2 said second attachment device are disposed on said first side, and wherein said first connector  
3 and said second connector are disposed on said second side.

1           5.     The power supply module of claim 1, wherein said one or more accessors each  
2 further comprises an information receiving device, and wherein said power supply module  
3 further comprises a data interface disposed on said enclosure, such that when said power supply  
4 module is releaseably attached to said gripper mechanism, said information receiving device is  
5 disposed adjacent said data interface.

1           6.     The power supply module of claim 5, wherein said data interface is disposed on  
2 said first side.

1           7.     An automated data storage and retrieval system for storing and accessing a  
2 plurality of portable data storage media stored in a plurality of storage slots, said automated data  
3 storage and retrieval system having at least one data storage drive for receiving said portable data  
4 storage media and reading and/or writing data thereon, and one or more accessors moveably  
5 disposed therein, wherein each of said one or more accessors comprises at least one gripper  
6 mechanism, said automated data storage system comprising:

7           one or a plurality of power supply module receiving slots;

8           one or a plurality of first power connection devices, wherein one of said one or a plurality  
9 of first power connection devices is disposed adjacent each of said one or a plurality of power  
10 supply module receiving slots;

11 one or a plurality of second power connection devices, wherein one of said one or a  
12 plurality of second power connection devices is disposed adjacent each of said one or a plurality  
13 of power supply module receiving slots;  
14 one or a plurality of power supply modules removably disposed in said one or a plurality  
15 of power supply module receiving slots;  
16 wherein each of said one or a plurality of power supply modules is releaseably connected  
17 to one of said one or a plurality of first power connection devices; and  
18 wherein each of said one or a plurality of power supply modules is releaseably connected  
19 to one of said one or a plurality of second power connection devices.

20  
21 8. The automated data storage and retrieval system of claim 7, further comprising  
22 one or a plurality of power components, wherein each of said one or a plurality of first power  
23 connection devices is disposed within one of said one or a plurality of power components, and  
24 wherein each of said one or a plurality of second power connection devices is disposed within  
25 one of said one or a plurality of power components.

26  
27 9. The automated data storage and retrieval system of claim 7, further comprising  
28 one or a plurality of backplane connectors, wherein said one or a plurality of first power  
29 connection devices is disposed on said one or a plurality of backplane connectors, and wherein  
30 said one or a plurality of second power connection devices is disposed on said one or a plurality  
31 of backplane connectors.

32  
33 10. The automated data storage and retrieval system of claim 7, wherein each of said  
34 one or a plurality of power supply modules comprises:  
35 an enclosure having a first side and a second side;

4 a power supply internally disposed within said enclosure, wherein said power supply  
5 transforms first power having a first voltage into second power having a second voltage;  
6 a first attachment device disposed on said enclosure, wherein said first attachment device  
7 can be releaseably attached to said gripper mechanism disposed on said one or a plurality of  
8 accessors; and  
9 a first connector disposed on said enclosure and connected to said power supply, wherein  
10 said first connector can be releaseably connected to one of said one or a plurality of first power  
11 connection devices and releaseably connected to one of said one or a plurality of second power  
12 connection device.

11. The automated data storage and retrieval system of claim 10, wherein each of said  
one or a plurality of power supply modules further comprises a second connector disposed on  
said enclosure and connected to said power supply, wherein said first connector can be  
releaseably connected to one of said one or a plurality of first power connection devices, and  
wherein said second connector can be releaseably connected to one of said one or a plurality of  
second power connection devices.

12. The automated data storage and retrieval system of claim 7, wherein each of said  
one or a plurality of power supply modules further comprises a second attachment device  
disposed on said enclosure, wherein said second attachment device can be releaseably attached to  
said gripper mechanism.

13. The automated data storage and retrieval system of claim 7, wherein said one or a  
plurality of accessors each further comprises an information receiving device, and wherein each  
of said one or a plurality of power supply modules further comprises a data interface disposed on  
said enclosure, such that when one of said one or a plurality of power supply modules is

5 releaseably attached to said gripper mechanism disposed on one of said one or a plurality of  
6 accessors, said information receiving device is disposed adjacent said data interface.

1 14. A method for supplying power in an automated data storage and retrieval system,  
2 wherein said automated data storage and retrieval system includes an external power source  
3 which supplies first power having a first voltage and one or a plurality of power supply module  
4 receiving slots, said method comprising the steps of:

5 removably disposing a power supply module in one of said one or a plurality of power  
6 supply module receiving slots, wherein said power supply module comprises an enclosure and a  
7 power supply disposed within said enclosure, wherein said power supply transforms said first  
8 power into second power having a second voltage;

9 supplying said first power to said power supply module; and

10 transforming said first power into said second power.

11 15. The method of claim 14, wherein said power supply module further comprises an  
attachment device disposed on said enclosure, and wherein said automated data storage and  
retrieval system further comprises one or a plurality of robotic accessors moveably disposed  
therein, each of said one or a plurality of accessors comprising a gripper mechanism, wherein  
said removably disposing step further comprises the steps of:

6 attaching said gripper mechanism disposed on one of said one or a plurality of accessors  
7 to said attachment device disposed on said power supply module;

8 transporting said power supply module to said one of said one or a plurality of power  
9 supply module receiving slots;

10 inserting said power supply module into said one of said one or a plurality of power

11 supply module receiving slots; and

releasing said attachment device from said gripper mechanism.

16. The method of claim 14, wherein said power supply module further comprises a first connector disposed on said enclosure and connected to said power supply, and wherein said automated data storage and retrieval system further comprises a first power bus internally disposed therein and providing said first power, a second power bus internally disposed therein and providing said second power, one or a plurality of first power connection devices connected to said first power bus, one or a plurality of second power connection devices connected to said second power bus, said method further comprising the steps of:

releaseably connecting said first connector to one of said one or a plurality of first power connection devices; and

releaseably connecting said first connector to one of said one or a plurality of second power connection devices.

17. The method of claim 16, wherein said power supply module further comprises and a second connector disposed on said enclosure and connected to said power supply, wherein said releaseably connecting steps comprise the steps of:

releaseably connecting said first connector to one of said one or a plurality of first power connection devices; and

releaseably connecting said second connector to one of said one or a plurality of second power connection devices.

18. A method to monitor the operation of a first power supply module removably disposed in a power supply module receiving slot disposed within an automated data storage and retrieval system, said first power supply module comprising an enclosure, a data interface disposed on said enclosure, and an attachment device disposed on said enclosure, said automated

5 data storage system comprising a controller having a first communication device, one or a  
6 plurality of accessors moveably disposed therein, wherein each of said one or a plurality of  
7 robotic accessors comprises a gripper mechanism, an information receiving device, and a second  
8 communication device in communication with said first communication device, said method  
9 comprising the steps of:

10 positioning the information receiving device disposed on one of said one or a plurality of  
11 accessors adjacent said data interface disposed on said first power supply module;

12 communicating first information from said first power supply module to said accessor;

13 communicating said first information from said accessor to said controller; and

14 analyzing said first information.

1 19. The method of claim 18, wherein said accessor further comprises a memory  
2 buffer, said method further comprising the step of storing said first information in said memory  
3 buffer.

1 20. The method of claim 18, wherein said analyzing step further comprises the steps  
2 of:

3 providing second information;

4 generating a comparison between said first information and said second information; and

5 determining the performance of said power supply module based upon said comparison.

1 21. The method of claim 18, further comprising the steps of:

2 releaseably attaching the gripper mechanism disposed on said one of said one or a  
3 plurality of robotic accessors to said attachment device;

4 removing said first power supply module from said power supply module receiving slot;

5 retrieving a second power supply module; and

6 inserting said second power supply module into said power supply module receiving slot.

1 22. The method of claim 21, wherein said automated data storage and retrieval system  
2 further comprises a plurality of storage slots, said method further comprising the step of storing  
3 said first power supply module in one of said plurality of storage slots.

1 23. The method of claim 21, wherein said automated data storage and retrieval system  
2 further comprises an import/export port, said method further comprising the step of removing  
3 said first power supply module from said automated data storage and retrieval system via said  
4 import/export port.

1 24. An automated data storage and retrieval system comprising a computer useable  
2 medium having computer readable program code disposed therein for providing power within  
3 said automated data storage and retrieval system, wherein said automated data storage and  
4 retrieval system comprises an external power source which supplies first power having a first  
5 voltage and one or a plurality of power supply module receiving slots, the computer readable  
6 program code comprising a series of computer readable program steps to effect:

7 removably disposing a power supply module in one of said one or a plurality of power  
8 supply module receiving slots, wherein said power supply module comprises an enclosure and a  
9 power supply disposed within said enclosure, wherein said power supply transforms said first  
10 power into second power having a second voltage;

11 supplying said first power to said power supply module; and

12 transforming said first power into said second power.

1 25. The automated data storage and retrieval system of claim 24, wherein said  
2 automated data storage and retrieval system further comprises one or a plurality of accessors  
3 moveably disposed therein, each of said one or a plurality of accessors comprising at least one



gripper mechanism, and wherein said power supply module further comprises an attachment device disposed on said enclosure, a first connector disposed on said enclosure and connected to said power supply, and a second connector disposed on said enclosure and connected to said power supply, said computer readable program code further comprising a series of computer readable program steps to effect:

releaseably attaching the gripper mechanism disposed on one of said one or a plurality of accessors to said attachment device;

transporting said power supply module to said one of said one or a plurality of power supply module receiving slots; and

inserting said power supply module into said one of said one or a plurality of power supply module receiving slots; and

releasing said attachment device from said gripper mechanism.

26. The automated data storage and retrieval system of claim 25, wherein said automated data storage and retrieval system further comprises a first power bus internally disposed therein and providing said first power, a second power bus internally disposed therein and providing said second power, one or a plurality of first power connection devices connected to said first power bus, and one or a plurality of second power connection devices connected to said second power bus, said computer readable program code further comprising a series of computer readable program steps to effect:

releaseably connecting said first connector to one of said one or a plurality of first power connection devices; and

releaseably connecting said second connector to one of said one or a plurality of second power connection devices.

1           27.     An automated data storage and retrieval system comprising a computer useable  
2 medium having computer readable program code disposed therein to monitor operation of a first  
3 power supply module removably disposed within a power supply module receiving slot disposed  
4 in said automated data storage and retrieval system, said first power supply module comprising a  
5 data interface and an attachment device, said automated data storage system comprising a  
6 controller having a first communication device, one or a plurality of accessors moveably  
7 disposed therein, wherein each of said one or a plurality of accessors comprises at least one  
8 gripper mechanism, an information receiving device, and a second communication device  
9 connected to said information receiving device and in communication with said first  
10 communication device, the computer readable program code comprising a series of computer  
11 readable program steps to effect:

12                 positioning the information receiving device disposed on one of said one or a plurality of  
13 accessors adjacent said data interface disposed on said first power supply module;

14                 communicating first information from said first power supply module to said accessor;

15                 communicating said first information from said accessor to said controller; and

16                 analyzing said first information.

1           28.     The automated data storage and retrieval system of claim 27, wherein said  
2 accessor further comprises a memory buffer, said computer readable program code further  
3 comprising a series of computer readable program steps to effect storing said first information in  
4 said memory buffer.

1           29.     The automated data storage and retrieval system of claim 27, the computer  
2 readable program code further comprising a series of computer readable program steps to effect:  
3                 providing second information;

generating a comparison between said first information and said second information; and  
determining the performance of said first power supply module based upon said  
comparison.

30. The automated data storage and retrieval system of claim 27, the computer  
readable program code further comprising a series of computer readable program steps to effect:  
releaseably attaching the gripper mechanism disposed on said one of said one or a  
plurality of robotic accessors to said attachment device;  
removing said first power supply module from said power supply module receiving slot;  
retrieving a second power supply module;  
inserting said second power supply module into said power supply module receiving slot.

31. The automated data storage and retrieval system of claim 30, wherein said  
automated data storage and retrieval system further comprises a plurality of storage slots, said  
computer readable program code further comprising a series of computer readable program steps  
to effect storing said first power supply module in one of said plurality of storage slots.

32. The automated data storage and retrieval system of claim 30, wherein said  
automated data storage and retrieval system further comprises an import/export port, said  
computer readable program code further comprising a series of computer readable program steps  
to effect removing said first power supply module from said automated data storage and retrieval  
system via said import/export port.

33. An accessor moveably disposed within an automated data storage and retrieval  
system, wherein said automated data storage and retrieval system includes one or more power  
supply modules removably disposed therein, each of said one or more power supply modules

4 comprising an attachment device, said accessor comprising at least one gripper mechanism,  
5 wherein said gripper mechanism can be releaseably attached to said attachment device.

1 34. The accessor of claim 33, wherein each of said one or a plurality of power supply  
2 modules further comprises a data interface, and wherein said accessor further comprises an  
3 information receiving device, such that when said attachment device is releaseably connected to  
4 said gripper mechanism said information receiving device is disposed adjacent said data  
5 interface.

1 35. The accessor of claim 34, further comprising an accessor control card and a  
2 memory buffer disposed on said accessor control card, wherein said information receiving device  
is connected to said memory buffer.

36. The accessor of claim 35, further comprising a wireless communication device,  
wherein said wireless communication device is connected to said memory buffer.

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